Robert C. Colwell, Reg. No. 27,431   *(650) 326-2400*

Applicant: Atsushi TANAKA, *et al.*
Title: Network Converter And Information Processing System
Attorney Docket No. 16869K-112900US
Sheet 1 of 7

| INFORMATION PROCESSING DEVICE ~10 | INFORMATION PROCESSING DEVICE ~10 | INFORMATION PROCESSING DEVICE ~10 |

LAN

NETWORK CONVERTER ~20

CPU ~21

22

FIRST PROTOCOL CONVERSION SECTION ~23
SECOND PROTOCOL CONVERSION SECTION ~24
CONVERSION TABLE STORAGE SECTION ~25
FIRST IDENTIFICATION NUMBER CONVERSION SECTION ~26
SECOND IDENTIFICATION NUMBER CONVERSION SECTION ~27

MEMORY

CONVERSION TABLE

28

NETWORK CONVERTER ~20

MANAGEMENT TERMINAL
~40

SAN

SECURITY MANAGEMENT TABLE STORAGE SECTION
~33

MEMORY 34

SECURITY MANAGEMENT TABLE

35

39
39
30

DISK   DISK

31   31

30

DISK ~31   DISK ~31

LUN 0
LUN 1
32
32

FIG. 1

~27

iSCSI NAME	Node_Name(WWN)	N_Port_Name(WWN)
INFORMATION PROCESSING DEVICE #1	01020304	0101ABCD
INFORMATION PROCESSING DEVICE #2	030A0B0C	0201EF01
⋮	⋮	⋮
STORAGE DEVICE #1	0A010203	0A020100
⋮	⋮	⋮
default	FFFFFFFF (ACCESS DISABLED)	FFFFFFFF (ACCESS DISABLED)

FIG. 2

~35

Node_Name(WWN)	N_Port_Name(WWN)	LUN0	LUN1	···	LUNn
01020304	0101ABCD	1	0	···	0
030A0B0C	0201EF01	0	1	···	1
⋮	⋮	⋮	⋮	···	⋮
FFFFFFFF (ACCESS DISABLED)	FFFFFFFF (ACCESS DISABLED)	0	0	···	0

FIG. 3

START

RECEIVE COMBINATION OF NETWORK CONVERTER AND STORAGE DEVICE — S401

RECEIVE COMBINATION OF iSCSI NAME AND LUN OF STORAGE DEVICE — S402

RECEIVE COMBINATION OF iSCSI NAME AND LUN OF INFORMATION PROCESSING DEVICE HAVING ACCESS PERMISSION — S403

WWN AUTOMATICALLY GENERATED? — S404

NO

YES

GENERATE WWN CORRESPONDING TO iSCSI NAME OF INFORMATION PROCESSING DEVICE HAVING ACCESS PERMISSION — S405

RECEIVE WWN CORRESPONDING TO iSCSI NAME OF INFORMATION PROCESSING DEVICE HAVING ACCESS PERMISSION — S406

TRANSMIT COMBINATION OF WWN AND LUN OF INFORMATION PROCESSING DEVICE HAVING ACCESS PERMISSION TO STORAGE DEVICE — S407

TRANSMIT COMBINATION OF iSCSI NAME AND WWN OF STORAGE DEVICE TO NETWORK CONVERTER — S408

TRANSMIT COMBINATION OF iSCSI NAME AND WWN OF INFORMATION PROCESSING DEVICE HAVING ACCESS PERMISSION TO NETWORK CONVERTER — S409

END

FIG. 4

511 — SOURCE IP ADDRESS

512 — DESTINATION IP ADDRESS

IP HEADER
~510

IP PACKET
~500

0x03

LOGIN
REQUEST HEADER
~521

523 — INITIATOR iSCSI NAME

524 — TARGET iSCSI NAME

LOGIN
PARAMETER
~522

iSCSI PROTOCOL
DATA UNIT
~520

NETWORK CONVERTER ~ 20

541 — D_ID
(DESTINATION NATIVE ADDRESS)

542 — S_ID
(SOURCE NATIVE ADDRESS)

FC HEADER
~540

FC FRAME
~530

0x03000000

551 — N_Port_Name

552 — Node_Name

PLOGI PARAMETER
~550

FIG. 5

Robert C. Colwell, Reg. No. 27,431   *(650) 326-2400*
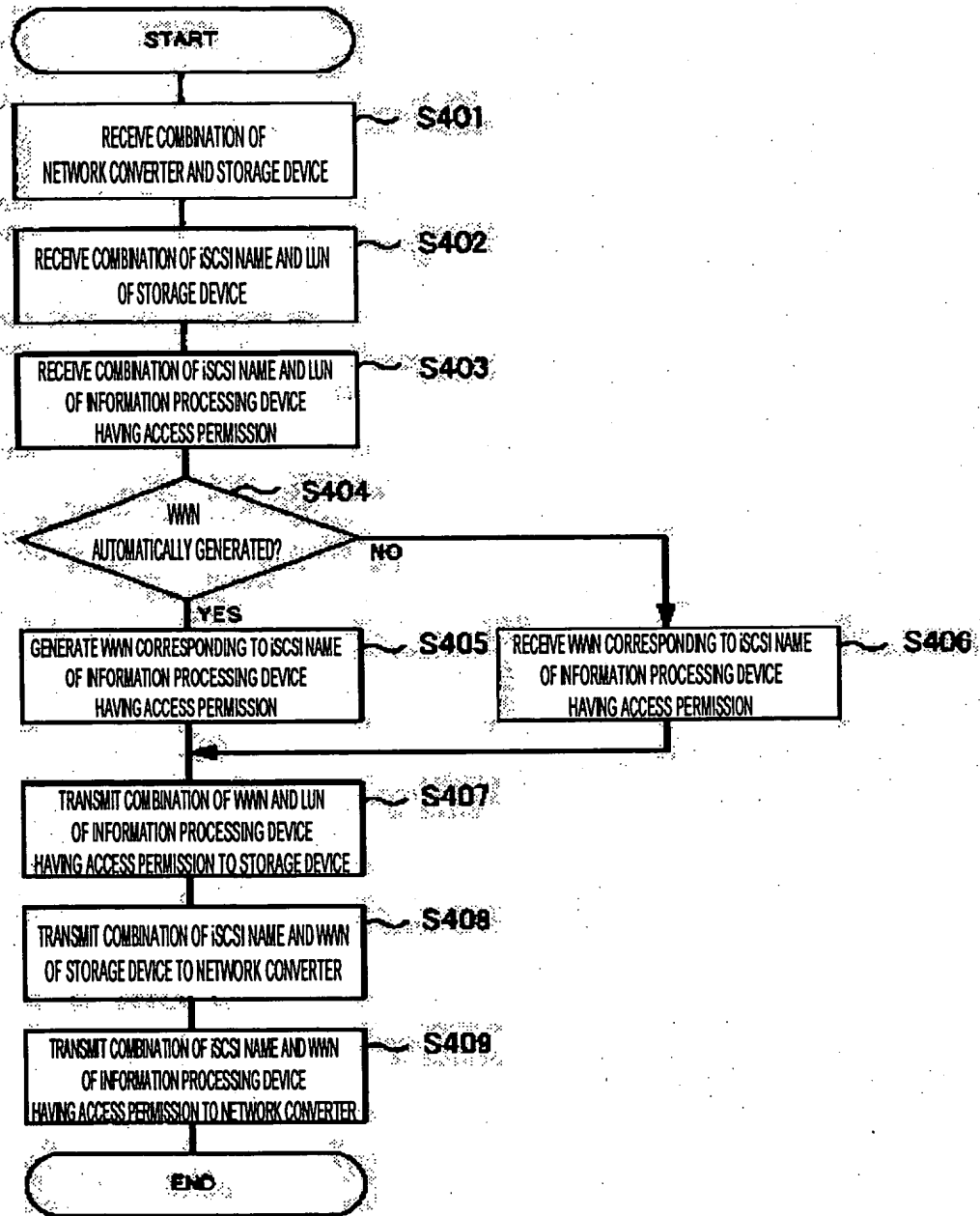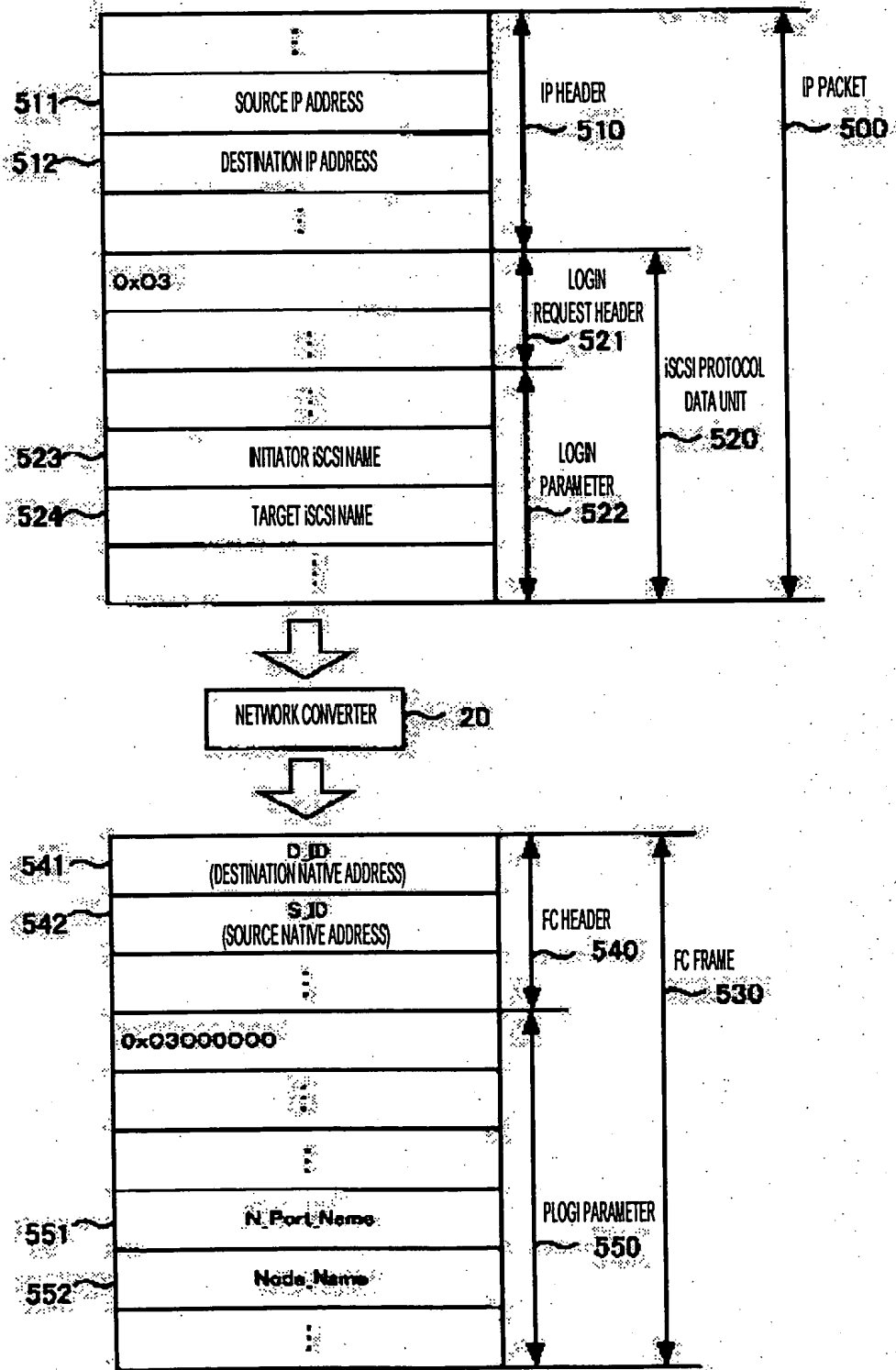
Applicant: Atsushi TANAKA, *et al.*
Title: Network Converter And Information Processing System
Attorney Docket No. 16869K-112900US
Sheet 5 of 7

<INFORMATION PROCESSING DEVICE>   <NETWORK CONVERTER>   <STORAGE DEVICE>

S601
TRANSMIT iSCSI LOGIN REQUEST

S602
ACQUIRE WWN OF INFORMATION PROCESSING DEVICE

S603
FC LOGIN OF INFORMATION PROCESSING DEVICE

S604
ACQUIRE NATIVE ADDRESS OF INFORMATION PROCESSING DEVICE

S605
ACQUIRE WWN OF STORAGE DEVICE

S606
ACQUIRE NATIVE ADDRESS OF STORAGE DEVICE

S607
TRANSMIT FC FRAME (PLOGI) (INCLUDING WWN AND S_ID)

S608
STORE WWN AND S_ID AND TRANSMIT ACC FRAME

S609
ACQUIRE WWNS OF INFORMATION PROCESSING DEVICE AND STORAGE DEVICE

S610
ACQUIRE iSCSI NAMES OF INFORMATION PROCESSING DEVICE AND STORAGE DEVICE

S612
TRANSMIT SCSI COMMAND (INCLUDING LUN)

S611
RETURN iSCSI LOGIN RESPONSE

S613
ACQUIRE WWNS OF INFORMATION PROCESSING DEVICE AND STORAGE DEVICE

S614
ACQUIRE NATIVE ADDRESSES OF INFORMATION PROCESSING DEVICE AND STORAGE DEVICE

S615
TRANSMIT FC FRAME (INCLUDING S_ID AND LUN)

S616
CHECK ACCESS ENABLE/DISABLE OF INFORMATION PROCESSING DEVICE BASED ON S_ID AND LUN

S618
ACQUIRE WWNS OF INFORMATION PROCESSING DEVICE AND STORAGE DEVICE

S617
TRANSMIT FC FRAME INCLUDING iSCSI COMMAND PROCESSING RESULT

S619
ACQUIRE iSCSI NAMES OF INFORMATION PROCESSING DEVICE AND STORAGE DEVICE

S621
RECEIVE SCSI COMMAND PROCESSING RESULT

S620
TRANSMIT SCSI RESPONSE INCLUDING SCSI COMMAND PROCESSING RESULT

FIG. 6

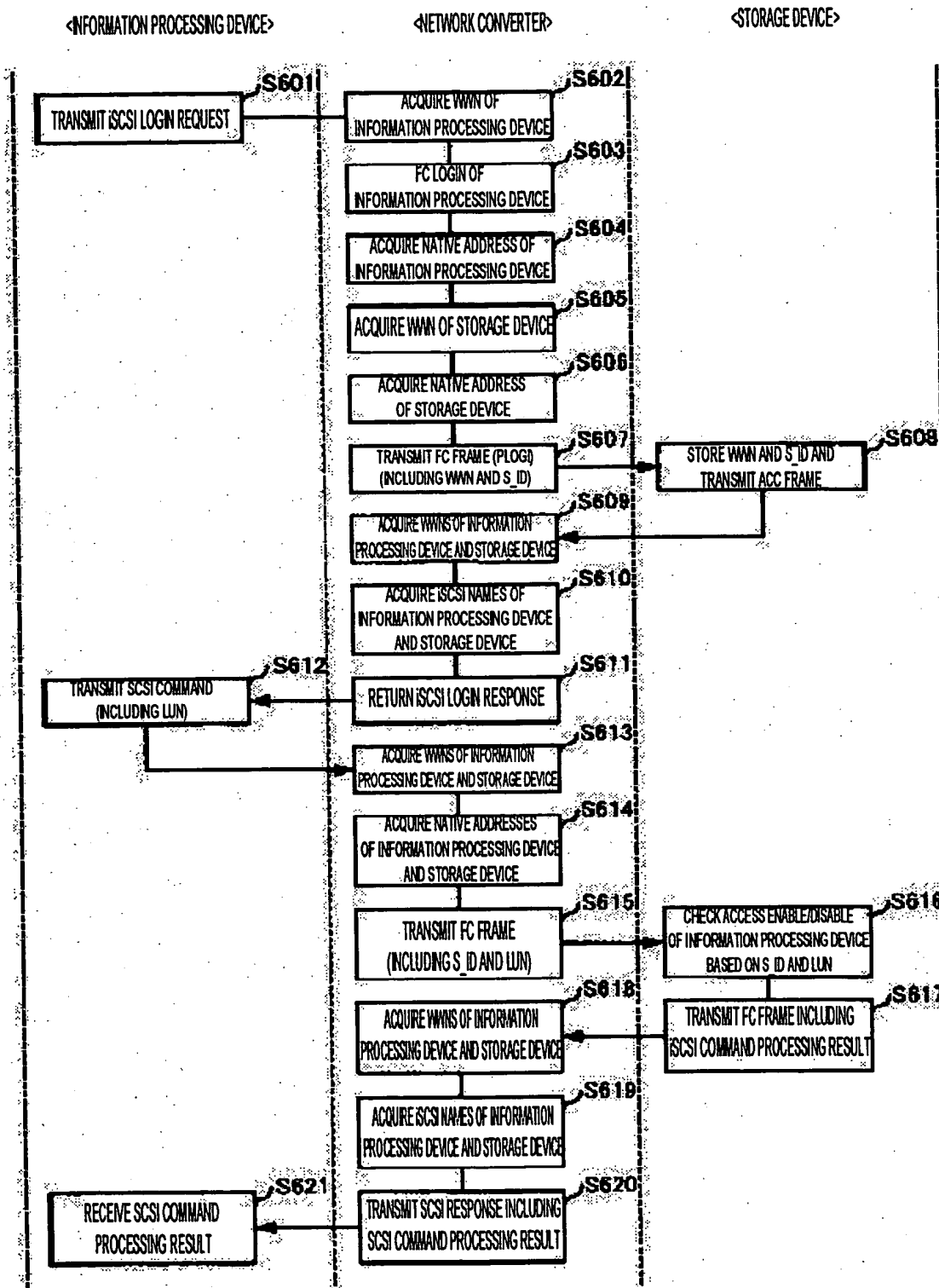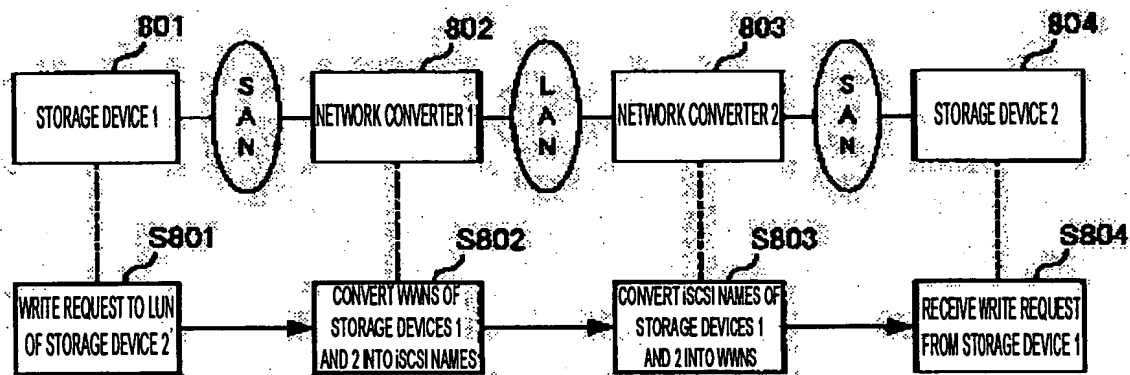*Robert C. Colwell, Reg. No. 27,431*   *(650) 326-2400*

Applicant: Atsushi TANAKA, *et al.*
Title: Network Converter And Information Processing System
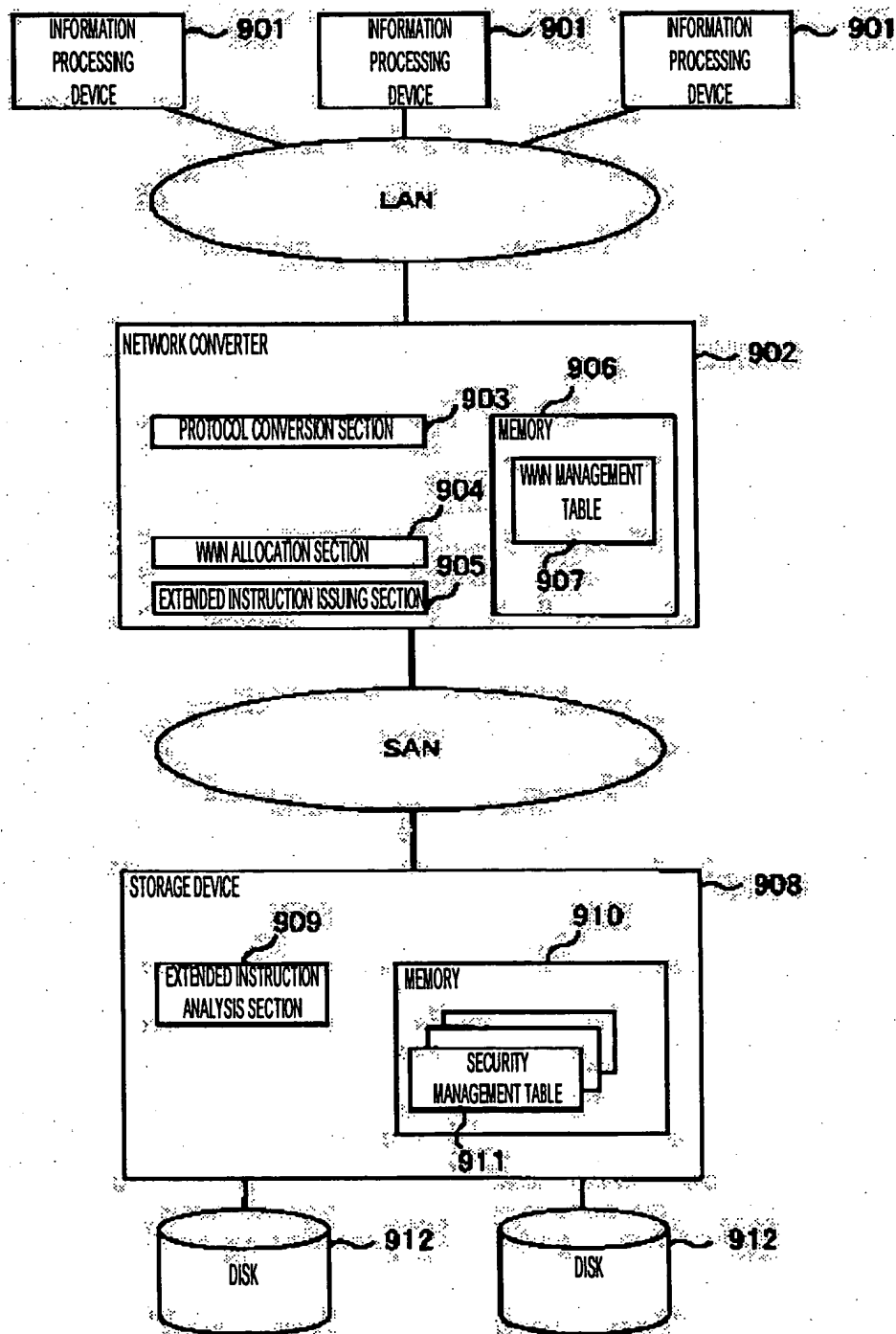**Attorney Docket No.** 16869K-112900US
Sheet 6 of 7

NATIVE ADDRESS	Node_Name(WWN)	N_Port_Name(WWN)	~701
0001	01020304	0101ABCD	
0002	030A0B0C	0201EF01	
⋮	⋮	⋮	
0005	FFFFFFFF	FFFFFFFF	

FIG. 7

801		802		803		804
STORAGE DEVICE 1	SAN	NETWORK CONVERTER 1	LAN	NETWORK CONVERTER 2	SAN	STORAGE DEVICE 2

S801	S802	S803	S804
WRITE REQUEST TO LUN OF STORAGE DEVICE 2	CONVERT WWNS OF STORAGE DEVICES 1 AND 2 INTO iSCSI NAMES	CONVERT iSCSI NAMES OF STORAGE DEVICES 1 AND 2 INTO WWNS	RECEIVE WRITE REQUEST FROM STORAGE DEVICE 1

FIG. 8

FIG. 9